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A.D. 1870, 20th AUGUST. N<sup>o</sup> 2297.

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S P E C I F I C A T I O N

OF

JOSEPH JUDGE HAYS.

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PURIFYING AND UTILIZING SEWAGE.

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LONDON:

PRINTED BY GEORGE E. EYRE AND WILLIAM SPOTTISWOODE,

PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY:

PUBLISHED AT THE GREAT SEAL PATENT OFFICE,

25, SOUTHAMPTON BUILDINGS, HOLBORN.

1871.





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A.D. 1870, 20th AUGUST. N° 2297.

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**Purifying and Utilizing Sewage.**

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**LETTERS PATENT** to Joseph Judge Hays, of Hertingforbury, in the County of Hertford, Gentleman, for the Invention of “**IMPROVEMENTS IN PURIFYING, DEODORIZING, AND UTILIZING SEWAGE AND OTHER REFUSE AND DELETERIOUS MATTERS, AND FOR MACHINERY THEREIN EMPLOYED.**”

Sealed the 17th February 1871, and dated the 20th August 1870.

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**PROVISIONAL SPECIFICATION** left by the said Joseph Judge Hays at the Office of the Commissioners of Patents, with his Petition, on the 20th August 1870.

I, JOSEPH JUDGE HAYS, of Hertingforbury, in the County of Hertford, Gentleman, do hereby declare the nature of the said Invention for “**IMPROVEMENTS IN PURIFYING, DEODORIZING, AND UTILIZING SEWAGE AND OTHER REFUSE AND DELETERIOUS MATTERS, AND FOR MACHINERY THEREIN EMPLOYED,**” to be as follows :—

My Invention consists of a two-fold process whereby the solids contained in sewage or other refuse or other deleterious matter contained in water are deposited and converted into manure or other solid matter and the aqueous portions purified by filtration through peat charcoal.



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To carry out this process I construct, firstly, a machine for mixing ground peat, peat charcoal, or other earthy carbonaceous and metallic matters with the sewage or other deleterious matter as the same issues from the main drain, sewer pipe, or other outlet, or they may be mixed together at any other point as circumstances may determine or require. 5 This machine consists of a rotating wheel carrying blades or arms and partially immersed in the fluid sewage or other deleterious matter. This wheel rotates in a chamber over which is a screw arrangement or other contrivance for supplying a given quantity of dust ground from peat, or peat charcoal, or other absorbent material of a similar character 10 as the case may be. The screw for feeding the dust to the wheel is made to turn by means of a small water wheel actuated by the flow of the sewage or other deleterious matter, and thus when once regulated to supply a certain quantity of peat charcoal dust to a given quantity of sewage or other deleterious matter it continues self-acting. The herein- 15 before described mixing machine may when necessary be set in motion by steam or other power and amalgamates the sewage with the dust which are made to flow together by suitable channels into settling reservoirs or tanks. These tanks should be arranged in series in order to facilitate the removal of the manure or other deposited matter from 20 one or more while the remainder are receiving the sewage or other deleterious matters from the mixers. The mixture of peat charcoal with the solid portions of sewage forms a good manure which on the addition of a smaller proportion of dry peat charcoal dust becomes sufficiently dry for transport. 25

The purification and deodorization of the liquids which are allowed to pass off from the settling tanks form the second part of my Invention, and is conducted as follows :—The arrangement I prefer to adopt consists of a series of parallel banks of gravel or dry masonry so constructed as to permit the water from the sewage to pass freely without allowing any 30 solid particles of the filtering materials to go through. Between two of these parallel walls I place the filtering mixture which consists of ground peat charcoal mixed with sand, ground burnt clay, or other materials that may be conveniently obtainable. This is preferable to employing charcoal alone, it forms a more complete filter, and the fluids 35 remain in contact with the charcoal for a longer period, a large filtering area being obtained without a proportionately increased quantity of charcoal. The fluid portions of the sewage by this arrangement flow



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between each alternate pair of parallel walls, pass through the filters, and flow off on the opposite side.

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SPECIFICATION in pursuance of the conditions of the Letters Patent,  
filed by the said Joseph Judge Hays in the Great Seal Patent Office  
5 on the 20th February 1871.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, JOSEPH  
JUDGE HAYS, of Hertingfordbury, in the County of Hertford, Gentleman,  
send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her  
10 Letters Patent, bearing date the Twentieth day of August, in the year  
of our Lord One thousand eight hundred and seventy, in the thirty-  
forth year of Her reign, did, for Herself, Her heirs and successors,  
give and grant unto me, the said Joseph Judge Hays, Her special licence  
that I, the said Joseph Judge Hays, my executors, administrators, and  
15 assigns, or such others as I, the said Joseph Judge Hays, my executors,  
administrators, and assigns, should at any time agree with, and no  
others, from time to time and at all times thereafter during the term  
therein expressed, should and lawfully might make, use, exercise, and  
vend, within the United Kingdom of Great Britain and Ireland, the  
20 Channel Islands, and Isle of Man, an Invention for "IMPROVEMENTS  
IN PURIFYING, DEODORIZING, AND UTILIZING SEWAGE AND OTHER REFUSE AND  
DELETERIOUS MATTERS," upon the condition (amongst others) that I, the  
said Joseph Judge Hays, my executors or administrators, by an instru-  
ment in writing under my, or their, or one of their hands and seals,  
25 should particularly describe and ascertain the nature of the said Inven-  
tion, and in what manner the same was to be performed, and cause  
the same to be filed in the Great Seal Patent Office within six calendar  
months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that I, the said Joseph Judge Hays, do hereby  
30 declare the nature of my said Invention, and in what manner the same  
is to be performed, to be particularly described and ascertained in and  
by the following statement :—

My Invention has a two-fold object, namely, the deposit of the solids  
contained in sewage or other refuse or deleterious matters contained in  
35 water, or the conversion thereof into manure and other solid matter.



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Also the purification of the aqueous portions by filtration through peat charcoal and other substances.

To carry out this two-fold object I use a process of mixing ground peat, peat charcoal, or other earthy carbonaceous and metallic matters with the sewage or other deleterious matters as the same issue from the main drain, sewer pipe, or other outlet, though they may be mixed together at any other point as circumstances may determine or require. This I prefer to effect in a machine consisting of a rotatory wheel carrying blades or arms and partially immersed in the fluid sewage or other deleterious matter. This wheel rotates in a chamber over which is a screw arrangement working in a hopper or other contrivance for supplying a given quantity of dust, ground from peat or peat charcoal or other absorbing material of a similar character as the case may be. The screw for feeding the dust to the wheels should be made to turn by means of a small water wheel actuated by the flow of the sewage or other deleterious matter or by any other contrivance, and thus when once regulated to supply a certain quantity of peat charcoal dust (to a given quantity of sewage or other deleterious matter) it continues self-acting. The herein-before described mixing machine may, when necessary, be set in motion by steam or other power and amalgamates the sewage with the dust which are made to flow together by suitable channels into settling reservoirs or tanks. These tanks should be arranged in series in order to facilitate the removal of the manure or other deposited matter from one or more, the remainder receiving the sewage or other deleterious matters from the mixers. The mixture of peat charcoal with the solid portions of sewage forms a good manure which on the addition of a small proportion of dry peat charcoal dust becomes sufficiently dry for transport.

The purification and deodorization of the liquids which are allowed to pass off from the settling tanks forms the second part of my Invention, and is conducted as follows:—To carry out these processes I prefer to adopt the following arrangements, namely, I use a series of parallel banks of gravel or dry masonry constructed so as to permit the water from the sewage to pass freely without allowing any solid particles of the filtering materials to go through. Between two of these parallel walls I place the filtering mixture which consists of ground burnt clay, chalk in lumps, or other materials that may be conveniently obtainable. This is preferable to employing charcoal alone, as the chalk in lumps absorbs



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any chlorine whilst the charcoal absorbs gases other than chlorine. Thus a more complete filter is formed and the fluids remain in contact with the charcoal for a longer period, a large filtering area being obtained without a proportionally increased quantity of charcoal. The fluid  
5 portions of the sewage by this arrangement flow between each alternate pair of parallel walls, pass through the filters and flow off on the opposite side.

The Drawing or diagram which accompanies these Presents and illustrates the mode of application of the aforesaid mixing machine and  
10 filtration arrangements having words and letters placed thereon specifying the parts on which they are placed will conjointively with the above description fully exemplify the nature of my Invention and the manner in which the same is to be performed or put in practice.

15 Having now particularly described the nature and object of my said Invention, and in what manner the same is to be performed, I hereby declare that I claim the Invention of the herein described improvements in purifying, deodorizing, and utilizing sewage and other refuse, and deleterious matters, and wherein the use of ground peat or peat charcoal  
20 in powder mixed in manner aforesaid and the filtration of the mixed liquid or surplus water after the solid sewage has subsided are peculiar features.

In witness whereof, I, the said Joseph Judge Hays, have here-  
unto set my hand and seal, this Eighteenth day of February,  
25 in the year of our Lord One thousand eight hundred and seventy-one.

JOSEPH JUDGE HAYS. (L.S.)

Witness,

THOMAS MORGAN,

30 Secretary,

Inventors' Patent Right Association, Limited,

21, Cockspur Street,

Charing Cross.

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LONDON:

Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,  
Printers to the Queen's most Excellent Majesty. 1871.



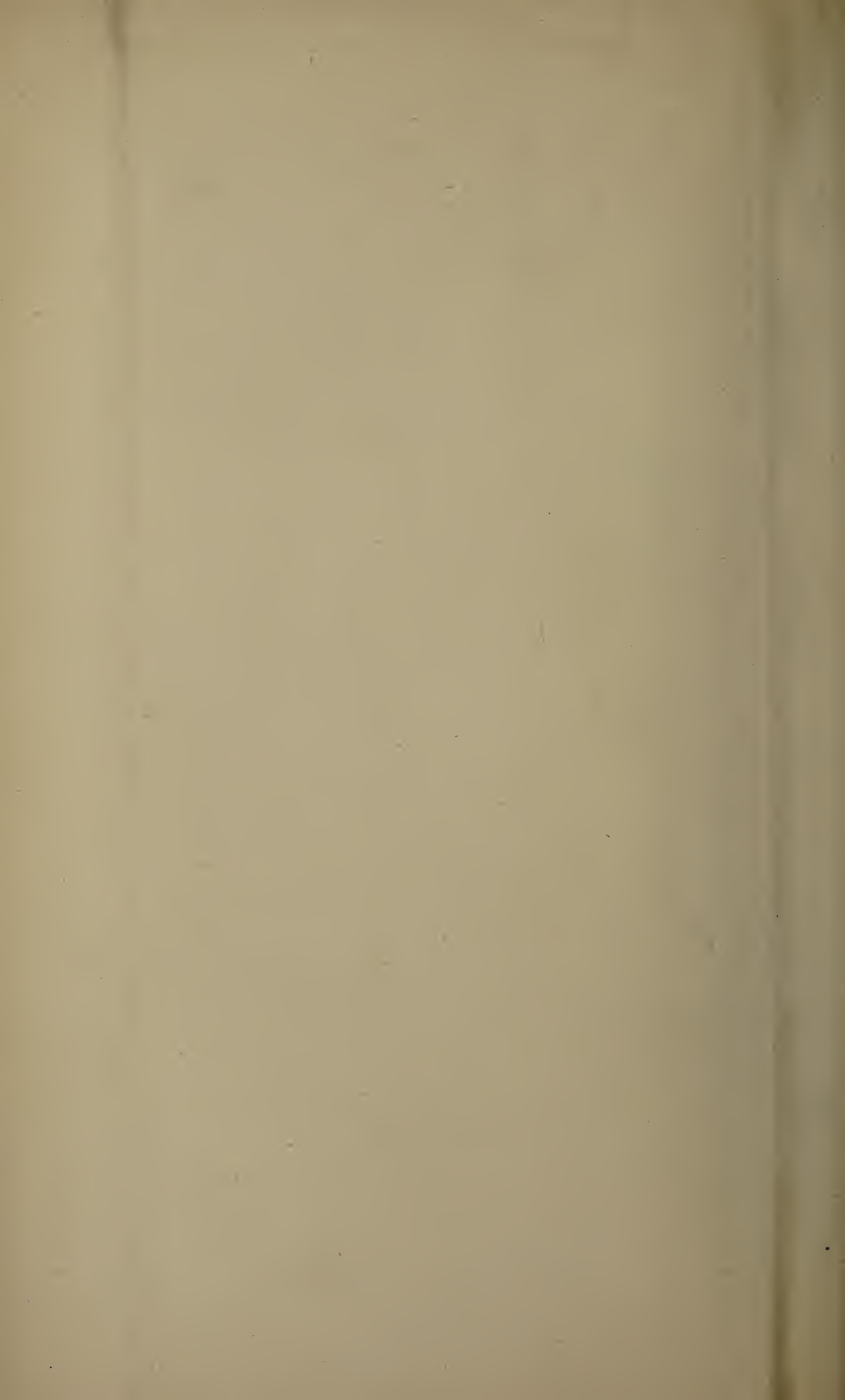




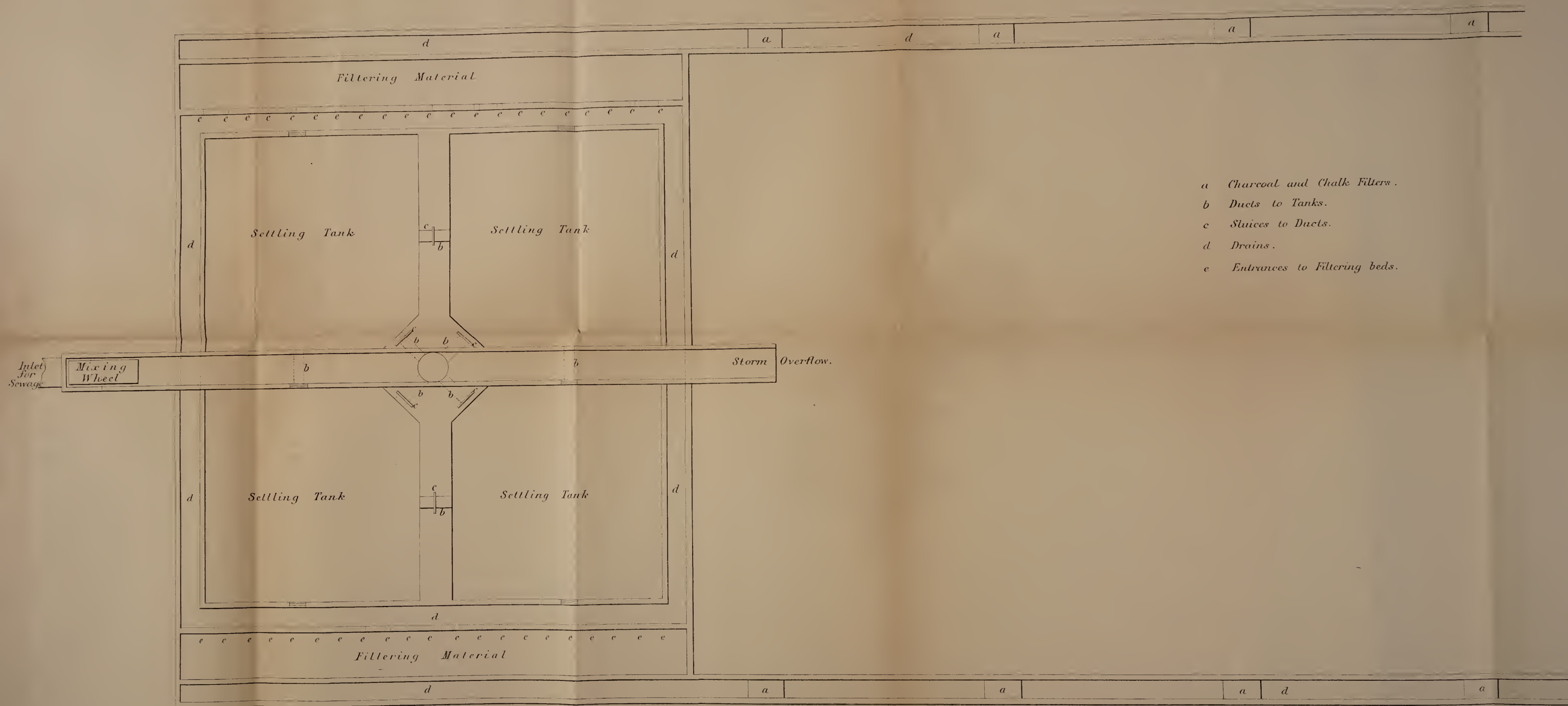












- a* Charcoal and Chalk Filters.
- b* Ducts to Tanks.
- c* Sluices to Ducts.
- d* Drains.
- e* Entrances to Filtering beds.

